



August 09, 2014

Mr. Scot Fitzgerald
CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Re: CHPRC SAF I14-034
Work Order: 352827
SDG: GEL352827

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 17, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer
Project Manager

Purchase Order: 300071ES20
Chain of Custody: I14-034-014 and I14-034-015
Enclosures



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Case Narrative

AUGUST 18, 2014

**General Narrative
for
Hanford MSA (51204)
CHPRC SAF I14-034
SDG: GEL352827**

August 09, 2014

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 17, 2014, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
352827001	B2WYP3
352827002	B2WYP4
352827003	B2WYR2
352827004	B2WYP9

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

AUGUST 18, 2014

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC/MS Volatile, General Chemistry, Metals and Radiochemistry. This package, to the best of my knowledge, is in compliance with technical and administrative requirements.



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

352827

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

I14-034-014

Page 1 of 1

Collector	J.R. Aguilar CHPRC	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	I14-034	Sampling Origin	Hanford Site	Purchase Order/Charge Code	30007IES20
Project Title	100KR4, JULY 2014	Logbook No.	HNF-N-506 <u>66/42</u>	Ice Chest No.	<u>628-407</u>
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	<u>970619009946</u>
Protocol	CERCLA	Priority:	30 Days	Offsite Property No.	<u>4940</u>

POSSIBLE SAMPLE HAZARDS/REMARKS

** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS

Total Activity Exemption: Yes ☒ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WYP3	N	W	7-16-14	0817	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01; 7470_MERCURY_CV: COMMON (AQUEOUS)	6 Months	HNO3 to pH <2
B2WYP3	N	W			4x40-mL aGs*	8260_VOA_GC/MS: COMMON; 8260_VOA_GC/MS: GW 01	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B2WYP3	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B2WYP4	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B2WYR2	Y	W	7-16-14	0817	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01; 7470_MERCURY_CV: COMMON (AQUEOUS)	6 Months	HNO3 to pH <2

Relinquished By J.R. Aguilar CHPRC	Print	Sign	Date/Time JUL 16 2014 0925	Received By CHRIS FULTON CHPRC	Print	Sign	Date/Time JUL 16 2014 0925
Relinquished By CHRIS FULTON CHPRC	Print	Sign	Date/Time JUL 16 2014 1400	Received By FEDER	Print	Sign	Date/Time JUL 16 2014 0925
Relinquished By	Print	Sign	Date/Time FEDER	Received By J. Pellegrini	Print	Sign	Date/Time 7-17-14 0905
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

Matrix *

S	=	Soil	DS	=	Drum Solids
SE	=	Sediment	DL	=	Drum Liquids
SO	=	Solid	T	=	Tissue
SL	=	Sludge	WT	=	Wipe
W	=	Water	L	=	Liquid
O	=	Oil	V	=	Vegetation
A	=	Air	X	=	Other

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By

Date/Time

PRINTED O 6/3/2014

A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

I14-034-015

Page 1 of 1

Collector	J.R. Aguilar CHPRC	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	I14-034	Sampling Origin	Hanford Site	Purchase Order/Charge Code	300071ES20
Project Title	100KR4, JULY 2014	Logbook No.	HNF-N-506 <u>66 / 42</u>	Ice Chest No.	<u>625-407</u>
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	<u>75069009946</u>
Protocol	CERCLA	Priority:	30 Days	Offsite Property No.	<u>4940</u>

POSSIBLE SAMPLE HAZARDS/REMARKS

*** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS

Hold Time

Total Activity Exemption: Yes ☒ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2WYP9	N	W	7-16-14	0817	1x250-mL G/P	9056_ANIONS_IC: COMMON	28 Days/48 Hours	Cool <=6C

Relinquished By	J.R. Aguilar CHPRC	Print	Sign	Received By	CHRIS FULTON CHPRC	Print	Sign	Date/Time	JUL 16 2014 0935
Relinquished By	CHRIS FULTON CHPRC	Print	Sign	Received By	FedEx	Print	Sign	Date/Time	JUL 16 2014 1400
Relinquished By	FedEx	Print	Sign	Received By	J. Pellegrini	Print	Sign	Date/Time	7-17-14 0905
Relinquished By		Print	Sign	Received By		Print	Sign	Date/Time	

S	=	Soil	DS	=	Drum Solids
SE	=	Sediment	DL	=	Drum Liquids
SO	=	Solid	T	=	Tissue
SL	=	Sludge	WI	=	Wipe
W	=	Water	L	=	Liquid
O	=	Oil	V	=	Vegetation
A	=	Air	X	=	Other

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By

Date/Time

PRINTED O 6/3/2014

A-6004-842 (REV 2)

Client: <u>HMSA</u>		SDG/AR/COC/Work Order: <u>352822/352827/352887</u>	
Received By: <u>JP</u>		Date Received: <u>7-19-14</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0 cpm</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130442941</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other

Comments (Use Continuation Form if needed):

7706 1900 9944

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: **HMSA**

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely preformed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

Laboratory Certifications

List of current GEL Certifications as of 09 August 2014

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122014-14
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Volatile Analysis

Case Narrative

AUGUST 18, 2014
ChemStation Case Narrative
Hanford MSA (HMSA)
SDG GEL352827

Method/Analysis Information

Procedure: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Batch Number: 1404220

Sample Analysis

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

Sample ID	Client ID
352827001	B2WYP3
1203129431	352827001(B2WYP3) Post Spike (PS)
1203129432	352827001(B2WYP3) Post Spike Duplicate (PSD)
1203129435	352827001(B2WYP3) Post Spike (PS)
1203129436	352827001(B2WYP3) Post Spike Duplicate (PSD)
1203132565	Method Blank (MB)
1203132566	Laboratory Control Sample (LCS)
1203132567	Laboratory Control Sample (LCS)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The samples in this SDG were analyzed on an "as received" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 21.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 19.1.2. False positive analytes are designated on the quantitation report with a 'd' qualifier.

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package.

AUGUST 18, 2014

The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Blank (MB) Statement

The blank analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 352827001 (B2WYP3) was designated for spike analysis.

Matrix Spike (PS) Recovery Statement

The spike 1203129431 (B2WYP3) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Matrix Spike Duplicate (PSD) Recovery Statement

The spike duplicate 1203129432 (B2WYP3) recoveries were not all within the acceptance limits. See the Data Exception Report in the miscellaneous section of the data package.

Relative Percent Difference (RPD) Statement

The RPDs between the matrix spike pair met the acceptance limits.

Internal Standard (ISTD) Acceptance

The internal standard responses in all client and quality control samples met the required acceptance criteria.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-analyses were not required for samples in this SDG.

Miscellaneous Information**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1316001.

Manual Integrations

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

TIC Comment

Tentatively identified compounds (TIC) were not required for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

Residual Chlorine was not detected in any of the samples in this SDG.

System Configuration

The Volatile-GC/MS analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA2.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890N/HP5975C	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

AUGUST 18, 2014

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL352827 GEL Work Order: 352827

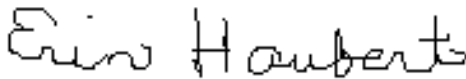
The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 13 AUG 2014

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF I14-034**

Report Date: July 22, 2014

Client Sample ID: B2WYP3
Lab Sample ID: 352827001
Matrix: WATER
Collect Date: 16-JUL-14 08:17
Receive Date: 17-JUL-14
Collector: Client

Project: HMSA00175
Client ID: HMSA001
Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>												
1,1,1-Trichloroethane	U	2.00	0.300	2.00	5.00	ug/L	1	CDS1	07/21/14	10:39	1404220	1
1,1,2-Trichloroethane	U	2.00	0.300	2.00	5.00	ug/L	1					
1,1-Dichloroethane	U	2.00	0.300	2.00	10.0	ug/L	1					
1,1-Dichloroethylene	U	2.00	0.300	2.00	10.0	ug/L	1					
1,2-Dichloroethane	U	2.00	0.300	2.00	5.00	ug/L	1					
1,4-Dichlorobenzene	U	2.00	0.300	2.00	5.00	ug/L	1					
2-Butanone	TU	10.0	3.00	10.0	10.0	ug/L	1					
4-Methyl-2-pentanone	U	10.0	3.00	10.0	10.0	ug/L	1					
Acetone	TU	10.0	3.00	10.0	20.0	ug/L	1					
Benzene	U	2.00	0.300	2.00	5.00	ug/L	1					
Carbon disulfide	U	10.0	1.60	10.0	5.00	ug/L	1					
Carbon tetrachloride	U	2.00	0.300	2.00	5.00	ug/L	1					
Chlorobenzene	U	2.00	0.300	2.00	5.00	ug/L	1					
Chloroform	J	0.330	0.300	2.00	5.00	ug/L	1					
Ethylbenzene	U	2.00	0.300	2.00	5.00	ug/L	1					
Methylene chloride	J	2.47	1.60	5.00	5.00	ug/L	1					
Propionitrile	U	10.0	3.00	10.0	10.0	ug/L	1					
Tetrachloroethylene	U	2.00	0.300	2.00	5.00	ug/L	1					
Tetrahydrofuran	U	10.0	1.50	10.0	50.0	ug/L	1					
Toluene	U	2.00	0.300	2.00	5.00	ug/L	1					
Trichloroethene	J	4.49	0.300	2.00	5.00	ug/L	1					
Vinyl chloride	U	2.00	0.300	2.00	10.0	ug/L	1					
Xylenes (total)	U	6.00	0.300	6.00	10.0	ug/L	1					
cis-1,2-Dichloroethylene	U	2.00	0.300	2.00	5.00	ug/L	1					
n-Butyl alcohol	U	250	83.3	250	100	ug/L	1					
trans-1,2-Dichloroethylene	U	2.00	0.300	2.00	5.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON + GW 01 "As	49.9 ug/L	50.0	99.8	(78%-124%)

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF I14-034**

Report Date: July 22, 2014

Client Sample ID: B2WYP3
 Lab Sample ID: 352827001

Project: HMSA00175
 Client ID: HMSA001
 Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Surrogate/Tracer recovery	Test				Result	Nominal	Recovery%	Acceptable Limits				
Bromofluorobenzene	Received"				51.0 ug/L	50.0	102	(80%-120%)				
	8260VOA_GCMS: COMMON + GW 01 "As											
	Received"											
Toluene-d8	8260VOA_GCMS: COMMON + GW 01 "As				47.3 ug/L	50.0	94.6	(80%-120%)				
	Received"											

Quality Control Summary

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QC Summary

Report Date: July 22, 2014

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 352827

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
QC1203132566	LCS										
1,1,1-Trichloroethane	50.0			49.8	ug/L		99.6	(70%-130%)	CDS1	07/21/14	08:08
1,1,2-Trichloroethane	50.0			43.6	ug/L		87.2	(70%-130%)			
1,1-Dichloroethane	50.0			43.9	ug/L		87.7	(70%-130%)			
1,1-Dichloroethylene	50.0			44.1	ug/L		88.2	(70%-130%)			
1,2-Dichloroethane	50.0			44.0	ug/L		88	(70%-130%)			
1,4-Dichlorobenzene	50.0			45.4	ug/L		90.8	(70%-130%)			
2-Butanone	250			202	ug/L		80.7	(70%-130%)			
4-Methyl-2-pentanone	250			194	ug/L		77.8	(70%-130%)			
Acetone	250			249	ug/L		99.5	(70%-130%)			
Benzene	50.0			44.2	ug/L		88.3	(70%-130%)			
Carbon disulfide	250			223	ug/L		89.4	(70%-130%)			
Carbon tetrachloride	50.0			50.5	ug/L		101	(70%-130%)			
Chlorobenzene	50.0			45.1	ug/L		90.2	(70%-130%)			
Chloroform	50.0			46.7	ug/L		93.4	(70%-130%)			
Ethylbenzene	50.0			45.6	ug/L		91.3	(70%-130%)			
Methylene chloride	50.0			43.9	ug/L		87.7	(70%-130%)			
Tetrachloroethylene	50.0			45.6	ug/L		91.1	(70%-130%)			
Toluene	50.0			43.3	ug/L		86.6	(70%-130%)			
Trichloroethene	50.0			47.1	ug/L		94.2	(70%-130%)			
Vinyl chloride	50.0			42.1	ug/L		84.1	(70%-130%)			

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
Xylenes (total)	150			136	ug/L		90.3	(70%-130%)	CDS1	07/21/14	08:08
cis-1,2-Dichloroethylene	50.0			45.3	ug/L		90.5	(70%-130%)			
n-Butyl alcohol	5000			3860	ug/L		77.2	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			44.0	ug/L		88.1	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.7	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0			51.4	ug/L		103	(80%-120%)			
**Toluene-d8	50.0			48.0	ug/L		96.1	(80%-120%)			
QC1203132567 LCS											
Propionitrile	250			230	ug/L		92.1	(70%-130%)		07/21/14	09:09
Tetrahydrofuran	250			236	ug/L		94.4	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.5	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0			50.7	ug/L		101	(80%-120%)			
**Toluene-d8	50.0			46.0	ug/L		92.1	(80%-120%)			
QC1203132565 MB											
1,1,1-Trichloroethane			U	ND	ug/L					07/21/14	09:39
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
1,4-Dichlorobenzene			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
Benzene			U	ND	ug/L				CDS1	07/21/14	09:39
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						
Propionitrile			U	ND	ug/L						
Tetrachloroethylene			U	ND	ug/L						
Tetrahydrofuran			U	ND	ug/L						
Toluene			U	ND	ug/L						
Trichloroethene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
cis-1,2-Dichloroethylene			U	ND	ug/L						
n-Butyl alcohol			U	ND	ug/L						
trans-1,2-Dichloroethylene			U	ND	ug/L						
**1,2-Dichloroethane-d4	50.0			51.3	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0			51.8	ug/L		104	(80%-120%)			
**Toluene-d8	50.0			47.2	ug/L		94.3	(80%-120%)			
QC1203129431 352827001 PS											
1,1,1-Trichloroethane	50.0	U	ND	49.5	ug/L		99	(70%-130%)		07/21/14	11:09

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
1,1,2-Trichloroethane	50.0	U	ND	45.0	ug/L		90	(70%-130%)	CDS1	07/21/14	11:09
1,1-Dichloroethane	50.0	U	ND	44.0	ug/L		87.9	(70%-130%)			
1,1-Dichloroethylene	50.0	U	ND	43.9	ug/L		87.8	(70%-130%)			
1,2-Dichloroethane	50.0	U	ND	45.4	ug/L		90.9	(70%-130%)			
1,4-Dichlorobenzene	50.0	U	ND	45.6	ug/L		91.1	(70%-130%)			
2-Butanone	250	TU	ND T	125	ug/L		50.2 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	ND	187	ug/L		74.6	(70%-130%)			
Acetone	250	TU	ND T	115	ug/L		46.1 *	(70%-130%)			
Benzene	50.0	U	ND	44.6	ug/L		89.2	(70%-130%)			
Carbon disulfide	250	U	ND	224	ug/L		89.7	(70%-130%)			
Carbon tetrachloride	50.0	U	ND	50.4	ug/L		101	(70%-130%)			
Chlorobenzene	50.0	U	ND	46.0	ug/L		91.9	(70%-130%)			
Chloroform	50.0	J	0.330	47.7	ug/L		94.7	(70%-130%)			
Ethylbenzene	50.0	U	ND	46.3	ug/L		92.6	(70%-130%)			
Methylene chloride	50.0	J	2.47	45.9	ug/L		86.9	(70%-130%)			
Tetrachloroethylene	50.0	U	ND	46.2	ug/L		92.4	(70%-130%)			
Toluene	50.0	U	ND	43.6	ug/L		87.2	(70%-130%)			
Trichloroethene	50.0	J	4.49	52.5	ug/L		96.1	(70%-130%)			
Vinyl chloride	50.0	U	ND	45.9	ug/L		91.8	(70%-130%)			
Xylenes (total)	150	U	ND	137	ug/L		91.6	(70%-130%)			
cis-1,2-Dichloroethylene	50.0	U	ND	46.2	ug/L		92.3	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
n-Butyl alcohol	5000	U	ND	4080	ug/L		81.6	(70%-130%)			
trans-1,2-Dichloroethylene	50.0	U	ND	43.2	ug/L		86.3	(70%-130%)	CDS1	07/21/14	11:09
**1,2-Dichloroethane-d4	50.0		49.9	51.5	ug/L		103	(78%-124%)			
**Bromofluorobenzene	50.0		51.0	50.0	ug/L		99.9	(80%-120%)			
**Toluene-d8	50.0		47.3	47.5	ug/L		95	(80%-120%)			
QC1203129435 352827001 PS											
Propionitrile	250	U	ND	201	ug/L		80.5	(70%-130%)		07/21/14	12:08
Tetrahydrofuran	250	U	ND	201	ug/L		80.3	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		49.9	49.6	ug/L		99.2	(78%-124%)			
**Bromofluorobenzene	50.0		51.0	50.8	ug/L		102	(80%-120%)			
**Toluene-d8	50.0		47.3	46.4	ug/L		92.7	(80%-120%)			
QC1203129432 352827001 PSD											
1,1,1-Trichloroethane	50.0	U	ND	49.8	ug/L	0.584	99.6	(0%-20%)		07/21/14	11:39
1,1,2-Trichloroethane	50.0	U	ND	44.0	ug/L	2.13	88.1	(0%-20%)			
1,1-Dichloroethane	50.0	U	ND	43.7	ug/L	0.502	87.5	(0%-20%)			
1,1-Dichloroethylene	50.0	U	ND	43.6	ug/L	0.755	87.1	(0%-20%)			
1,2-Dichloroethane	50.0	U	ND	45.4	ug/L	0.022	90.9	(0%-20%)			
1,4-Dichlorobenzene	50.0	U	ND	46.0	ug/L	1.00	92	(0%-20%)			
2-Butanone	250	TU	ND T	120	ug/L	4.46	48*	(0%-20%)			
4-Methyl-2-pentanone	250	U	ND	180	ug/L	3.71	71.9	(0%-20%)			
Acetone	250	TU	ND T	111	ug/L	3.71	44.4*	(0%-20%)			
Benzene	50.0	U	ND	44.6	ug/L	0.0448	89.2	(0%-20%)			
Carbon disulfide	250	U	ND	220	ug/L	1.84	88.1	(0%-20%)			
Carbon tetrachloride	50.0	U	ND	50.6	ug/L	0.317	101	(0%-20%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1404220										
Chlorobenzene	50.0	U	ND	45.8	ug/L	0.305	91.7	(0%-20%)	CDS1	07/21/14	11:39
Chloroform	50.0	J	0.330	47.5	ug/L	0.294	94.4	(0%-20%)			
Ethylbenzene	50.0	U	ND	46.3	ug/L	0.0216	92.6	(0%-20%)			
Methylene chloride	50.0	J	2.47	44.9	ug/L	2.22	84.9	(0%-20%)			
Tetrachloroethylene	50.0	U	ND	45.5	ug/L	1.42	91.1	(0%-20%)			
Toluene	50.0	U	ND	43.5	ug/L	0.207	87	(0%-20%)			
Trichloroethene	50.0	J	4.49	52.7	ug/L	0.304	96.4	(0%-20%)			
Vinyl chloride	50.0	U	ND	43.9	ug/L	4.46	87.8	(0%-20%)			
Xylenes (total)	150	U	ND	137	ug/L	0.569	91.1	(0%-20%)			
cis-1,2-Dichloroethylene	50.0	U	ND	46.0	ug/L	0.347	92	(0%-20%)			
n-Butyl alcohol	5000	U	ND	3910	ug/L	4.27	78.2	(0%-20%)			
trans-1,2-Dichloroethylene	50.0	U	ND	42.9	ug/L	0.534	85.9	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		49.9	51.2	ug/L		102	(78%-124%)			
**Bromofluorobenzene	50.0		51.0	51.1	ug/L		102	(80%-120%)			
**Toluene-d8	50.0		47.3	47.2	ug/L		94.5	(80%-120%)			
QC1203129436 352827001 PSD											
Propionitrile	250	U	ND	197	ug/L	2.15	78.7	(0%-20%)		07/21/14	12:39
Tetrahydrofuran	250	U	ND	203	ug/L	1.18	81.3	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		49.9	49.9	ug/L		99.9	(78%-124%)			
**Bromofluorobenzene	50.0		51.0	51.1	ug/L		102	(80%-120%)			
**Toluene-d8	50.0		47.3	46.2	ug/L		92.3	(80%-120%)			

Notes:

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

AUGUST 18, 2014

DATA EXCEPTION REPORT			
Mo.Day Yr. 22-JUL-14	Division: Federal	Quality Criteria: SOP	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: HMSA001
Batch ID: 1404220	Sample Numbers: see below		
Potentially affected work order(s)(SDG): 352773(GEL352773),352827(GEL352827) Application Issues: Failed Recovery for MS/PS Sample improperly preserved Failed Recovery for MSD/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Both vials of sample 352773002 contained head space. 2. The recoveries for several compounds were outside of acceptance limits in the MS and/or MSD performed on sample 352827001. The calculated relative percent differences between the MS and MSD for all monitored compounds were within acceptance limits.		1,2. Narrate and report data.	

Originator's Name:

Crystal Stacey 22-JUL-14

Data Validator/Group Leader:

Erin Haubert 22-JUL-14

Metals Analysis

Case Narrative

AUGUST 18, 2014
Metals Fractional Narrative
Hanford MSA (HMSA)
SDG GEL352827

Sample Analysis

Sample ID	Client ID
352827001	B2WYP3
352827003	B2WYR2
1203131219	Method Blank (MB) ICP
1203131220	Laboratory Control Sample (LCS)
1203131223	352948002(B2WX17L) Serial Dilution (SD)
1203131221	352948002(B2WX17S) Matrix Spike (MS)
1203131222	352948002(B2WX17SD) Matrix Spike Duplicate (MSD)
1203131122	Method Blank (MB) ICP-MS
1203131123	Laboratory Control Sample (LCS)
1203131126	352944002(B2X1H6L) Serial Dilution (SD)
1203131124	352944002(B2X1H6S) Matrix Spike (MS)
1203131125	352944002(B2X1H6SD) Matrix Spike Duplicate (MSD)
1203139986	Method Blank (MB) CVAA
1203139987	Laboratory Control Sample (LCS)
1203139997	352827001(B2WYP3L) Serial Dilution (SD)
1203139995	352827001(B2WYP3D) Sample Duplicate (DUP)
1203139996	352827001(B2WYP3S) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1404888, 1404850 and 1408293
Prep Batch :	1404887, 1404849 and 1408290
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 11, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 28
Analytical Method:	6010_METALS_ICP, 6020_METALS_ICPMS and 7470_HG_CVAA

Prep Method :

SW846 3005A and SW846 7470A Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 0.4L/min, argon gas flows of 13 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 352948002

(B2WX17)-ICP, 352944002 (B2X1H6)-ICP-MS and 352827001 (B2WYP3)-CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

Matrix Spike Duplicate (MSD) Recovery Statement

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the established acceptance percent difference criteria.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

AUGUST 18, 2014

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. A data exception report was not required for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Pat Stull Date: 08/18/2014

Sample Data Summary

AUGUST 18, 2014

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL352827 GEL Work Order: 352827

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

D Results are reported from a diluted aliquot of sample.

N Spike Sample recovery is outside control limits.

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by

Pat Stull 08/18/2014

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF I14-034**

Report Date: August 18, 2014

Client Sample ID: B2WYP3
Lab Sample ID: 352827001
Matrix: WATER
Collect Date: 16-JUL-14 08:17
Receive Date: 17-JUL-14
Collector: Client

Project: HMSA00175
Client ID: HMSA001
Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
<i>7470_MERCURY_CV: COMMON "As Received"</i>												
Mercury	U	0.200	0.067	0.200	0.200	ug/L	1	MTM	08/04/14	10:59	1408293	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: GW 04 (6 metals only) "As Received"</i>												
Calcium		52100	50.0	200	200	ug/L	1	HSC	08/08/14	08:12	1404888	2
Iron	U	100	30.0	100	100	ug/L	1					
Magnesium		14200	110	300	300	ug/L	1					
Potassium		5940	50.0	150	150	ug/L	1					
Sodium		15800	100	300	300	ug/L	1					
Vanadium		10.4	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Aluminum	U	50.0	15.0	50.0	50.0	ug/L	1	PRB	08/16/14	06:43	1404850	3
Antimony	U	3.00	1.00	3.00	3.00	ug/L	1					
Arsenic	B	3.20	1.70	5.00	5.00	ug/L	1					
Barium		38.0	0.600	2.00	2.00	ug/L	1					
Beryllium	U	0.500	0.200	0.500	0.500	ug/L	1					
Boron	B	13.8	4.00	15.0	15.0	ug/L	1					
Cadmium	U	1.00	0.110	1.00	1.00	ug/L	1					
Cobalt	U	1.00	0.100	1.00	1.00	ug/L	1					
Copper		9.50	0.350	1.00	1.00	ug/L	1					
Lead	B	0.583	0.500	2.00	2.00	ug/L	1					
Molybdenum		1.62	0.165	0.500	0.500	ug/L	1					
Selenium	U	5.00	1.50	5.00	5.00	ug/L	1					
Silver	U	1.00	0.200	1.00	1.00	ug/L	1					
Thallium	U	2.00	0.450	2.00	2.00	ug/L	1					
Thorium	U	2.00	0.383	2.00	2.00	ug/L	1					
Tin	U	5.00	1.00	5.00	5.00	ug/L	1					
Uranium		2.40	0.067	0.200	0.200	ug/L	1					
Zinc		13.3	3.50	10.0	10.0	ug/L	1					
Chromium		48.0	2.00	10.0	10.0	ug/L	1	PRB	08/16/14	14:56	1404850	4
Manganese	U	5.00	1.00	5.00	5.00	ug/L	1					
Nickel	B	0.982	0.500	2.00	2.00	ug/L	1					
Strontium		241	2.00	10.0	10.0	ug/L	1					

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF I14-034**

Report Date: August 18, 2014

Client Sample ID: B2WYP3
Lab Sample ID: 352827001

Project: HMSA00175
Client ID: HMSA001
Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
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The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXM5	07/29/14	0730	1404849
SW846 3005A	SW846 3005A for 6010C	JXM5	07/29/14	0730	1404887
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	08/01/14	1500	1408290

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF I14-034**

Report Date: August 18, 2014

Client Sample ID: B2WYR2
Lab Sample ID: 352827003
Matrix: WATER
Collect Date: 16-JUL-14 08:17
Receive Date: 17-JUL-14
Collector: Client

Project: HMSA00175
Client ID: HMSA001
Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
<i>7470_MERCURY_CV: COMMON "As Received"</i>												
Mercury	U	0.200	0.067	0.200	0.200	ug/L	1	MTM	08/04/14	11:08	1408293	1
Metals Analysis-ICP												
<i>6010_METALS_ICP: GW 04 (6 metals only) "As Received"</i>												
Calcium		49400	50.0	200	200	ug/L	1	HSC	08/08/14	08:15	1404888	2
Iron	U	100	30.0	100	100	ug/L	1					
Magnesium		13500	110	300	300	ug/L	1					
Potassium		5700	50.0	150	150	ug/L	1					
Sodium		15200	100	300	300	ug/L	1					
Vanadium		10.2	1.00	5.00	5.00	ug/L	1					
Metals Analysis-ICP-MS												
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>												
Aluminum	U	50.0	15.0	50.0	50.0	ug/L	1	PRB	08/16/14	06:49	1404850	3
Antimony	U	3.00	1.00	3.00	3.00	ug/L	1					
Arsenic	B	4.93	1.70	5.00	5.00	ug/L	1					
Barium		38.6	0.600	2.00	2.00	ug/L	1					
Beryllium	U	0.500	0.200	0.500	0.500	ug/L	1					
Boron	B	13.2	4.00	15.0	15.0	ug/L	1					
Cadmium	U	1.00	0.110	1.00	1.00	ug/L	1					
Cobalt	U	1.00	0.100	1.00	1.00	ug/L	1					
Copper		8.88	0.350	1.00	1.00	ug/L	1					
Lead	U	2.00	0.500	2.00	2.00	ug/L	1					
Molybdenum		1.61	0.165	0.500	0.500	ug/L	1					
Selenium	U	5.00	1.50	5.00	5.00	ug/L	1					
Silver	U	1.00	0.200	1.00	1.00	ug/L	1					
Thallium	U	2.00	0.450	2.00	2.00	ug/L	1					
Thorium	U	2.00	0.383	2.00	2.00	ug/L	1					
Tin	U	5.00	1.00	5.00	5.00	ug/L	1					
Uranium		2.57	0.067	0.200	0.200	ug/L	1					
Zinc		14.8	3.50	10.0	10.0	ug/L	1					
Chromium		49.2	2.00	10.0	10.0	ug/L	1	PRB	08/16/14	15:00	1404850	4
Manganese	U	5.00	1.00	5.00	5.00	ug/L	1					
Nickel	B	1.10	0.500	2.00	2.00	ug/L	1					
Strontium		248	2.00	10.0	10.0	ug/L	1					

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF I14-034**

Report Date: August 18, 2014

Client Sample ID: B2WYR2
 Lab Sample ID: 352827003

Project: HMSA00175
 Client ID: HMSA001
 Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
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The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JXM5	07/29/14	0730	1404849
SW846 3005A	SW846 3005A for 6010C	JXM5	07/29/14	0730	1404887
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	08/01/14	1500	1408290

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	7470_HG_CVAA	
2	6010_METALS_ICP	
3	6020_METALS_ICPMS	
4	6020_METALS_ICPMS	

Quality Control Summary

AUGUST 18, 2014
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QC Summary

Report Date: August 18, 2014

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 352827

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
QC1203131123	LCS										
Aluminum	2000			1930	ug/L		96.6	(80%-120%)	PRB	08/16/14	06:11
Antimony	50.0			48.2	ug/L		96.5	(80%-120%)			
Arsenic	50.0			51.6	ug/L		103	(80%-120%)			
Barium	50.0			47.8	ug/L		95.7	(80%-120%)			
Beryllium	50.0			51.1	ug/L		102	(80%-120%)			
Boron	100			95.1	ug/L		95.1	(80%-120%)			
Cadmium	50.0			48.9	ug/L		97.8	(80%-120%)			
Chromium	50.0			53.6	ug/L		107	(80%-120%)		08/16/14	14:32
Cobalt	50.0			49.7	ug/L		99.3	(80%-120%)		08/16/14	06:11
Copper	50.0			50.4	ug/L		101	(80%-120%)			
Lead	50.0			51.0	ug/L		102	(80%-120%)			
Manganese	50.0			54.5	ug/L		109	(80%-120%)		08/16/14	14:32
Molybdenum	50.0			48.6	ug/L		97.2	(80%-120%)		08/16/14	06:11
Nickel	50.0			54.9	ug/L		110	(80%-120%)		08/16/14	14:32
Selenium	50.0			51.0	ug/L		102	(80%-120%)		08/16/14	06:11
Silver	50.0			49.9	ug/L		99.7	(80%-120%)			
Strontium	50.0			53.7	ug/L		107	(80%-120%)		08/16/14	14:32
Thallium	50.0			44.5	ug/L		89	(80%-120%)		08/16/14	06:11
Thorium	50.0			53.9	ug/L		108	(80%-120%)			
Tin	50.0			50.8	ug/L		102	(80%-120%)			

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
Uranium	50.0			53.0	ug/L		106	(80%-120%)	PRB	08/16/14	06:11
Zinc	50.0			51.2	ug/L		102	(80%-120%)			
QC1203131122	MB										
Aluminum			U	ND	ug/L					08/16/14	06:05
Antimony			U	ND	ug/L						
Arsenic			U	ND	ug/L						
Barium			U	ND	ug/L						
Beryllium			U	ND	ug/L						
Boron			U	ND	ug/L						
Cadmium			U	ND	ug/L						
Chromium			U	ND	ug/L					08/16/14	14:28
Cobalt			U	ND	ug/L					08/16/14	06:05
Copper			U	ND	ug/L						
Lead			U	ND	ug/L						
Manganese			U	ND	ug/L					08/16/14	14:28
Molybdenum			U	ND	ug/L					08/16/14	06:05
Nickel			U	ND	ug/L					08/16/14	14:28
Selenium			U	ND	ug/L					08/16/14	06:05
Silver			U	ND	ug/L						
Strontium			U	ND	ug/L					08/16/14	14:28
Thallium			U	ND	ug/L					08/16/14	06:05
Thorium			U	ND	ug/L						

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
Tin			U	ND	ug/L				PRB	08/16/14	06:05
Uranium			U	ND	ug/L						
Zinc			U	ND	ug/L						
QC1203131124 352944002 MS											
Aluminum	2000	U	ND	1950	ug/L		97.3	(75%-125%)		08/16/14	07:27
Antimony	50.0	U	ND	53.3	ug/L		106	(75%-125%)			
Arsenic	50.0		6.60	58.6	ug/L		104	(75%-125%)			
Barium	50.0		42.0	94.1	ug/L		104	(75%-125%)			
Beryllium	50.0	U	ND	53.2	ug/L		106	(75%-125%)			
Boron	100	B	10.7	110	ug/L		99.4	(75%-125%)			
Cadmium	50.0	U	ND	51.7	ug/L		103	(75%-125%)			
Chromium	50.0	B	6.81	58.7	ug/L		104	(75%-125%)		08/16/14	15:21
Cobalt	50.0	B	0.101	51.2	ug/L		102	(75%-125%)		08/16/14	07:27
Copper	50.0	B	0.558	52.3	ug/L		104	(75%-125%)			
Lead	50.0	U	ND	51.3	ug/L		102	(75%-125%)			
Manganese	50.0	B	1.10	53.1	ug/L		104	(75%-125%)		08/16/14	15:21
Molybdenum	50.0		6.13	59.6	ug/L		107	(75%-125%)		08/16/14	07:27
Nickel	50.0		3.42	55.3	ug/L		104	(75%-125%)		08/16/14	15:21
Selenium	50.0	U	ND	52.5	ug/L		103	(75%-125%)		08/16/14	07:27
Silver	50.0	U	ND	52.9	ug/L		106	(75%-125%)			
Strontium	50.0		189	246	ug/L		114	(75%-125%)		08/16/14	15:21
Thallium	50.0	U	ND	44.9	ug/L		89.7	(75%-125%)		08/16/14	07:27

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
Thorium	50.0	U	ND	55.6	ug/L		110	(75%-125%)	PRB	08/16/14	07:27
Tin	50.0	U	ND	55.6	ug/L		111	(75%-125%)			
Uranium	50.0		3.14	56.9	ug/L		108	(75%-125%)			
Zinc	50.0	B	4.02	54.1	ug/L		100	(75%-125%)			
QC1203131125 352944002 MSD											
Aluminum	2000	U	ND	1910	ug/L	1.94	95.5	(0%-20%)		08/16/14	07:33
Antimony	50.0	U	ND	51.2	ug/L	4.01	102	(0%-20%)			
Arsenic	50.0		6.60	57.7	ug/L	1.62	102	(0%-20%)			
Barium	50.0		42.0	88.2	ug/L	6.51	92.3	(0%-20%)			
Beryllium	50.0	U	ND	53.2	ug/L	0.0508	106	(0%-20%)			
Boron	100	B	10.7	110	ug/L	0.394	99.8	(0%-20%)			
Cadmium	50.0	U	ND	50.3	ug/L	2.82	101	(0%-20%)			
Chromium	50.0	B	6.81	59.1	ug/L	0.751	105	(0%-20%)		08/16/14	15:24
Cobalt	50.0	B	0.101	51.4	ug/L	0.413	103	(0%-20%)		08/16/14	07:33
Copper	50.0	B	0.558	52.3	ug/L	0.00764	104	(0%-20%)			
Lead	50.0	U	ND	48.8	ug/L	4.98	97.1	(0%-20%)			
Manganese	50.0	B	1.10	53.1	ug/L	0.096	104	(0%-20%)		08/16/14	15:24
Molybdenum	50.0		6.13	58.3	ug/L	2.21	104	(0%-20%)		08/16/14	07:33
Nickel	50.0		3.42	54.9	ug/L	0.729	103	(0%-20%)		08/16/14	15:24
Selenium	50.0	U	ND	54.3	ug/L	3.35	107	(0%-20%)		08/16/14	07:33
Silver	50.0	U	ND	50.1	ug/L	5.55	100	(0%-20%)			
Strontium	50.0		189	241	ug/L	2.12	103	(0%-20%)		08/16/14	15:24

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
Thallium	50.0	U	ND	43.3	ug/L	3.51	86.6	(0%-20%)	PRB	08/16/14	07:33
Thorium	50.0	U	ND	52.1	ug/L	6.55	103	(0%-20%)			
Tin	50.0	U	ND	52.7	ug/L	5.43	105	(0%-20%)			
Uranium	50.0		3.14	53.1	ug/L	6.97	99.9	(0%-20%)			
Zinc	50.0	B	4.02	54.3	ug/L	0.247	100	(0%-20%)			
QC1203131126 352944002 SDILT											
Aluminum		U	ND DU	ND	ug/L	N/A		(0%-10%)		08/16/14	07:46
Antimony		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Arsenic			6.60 DU	ND	ug/L	N/A		(0%-10%)			
Barium			42.0 D	8.28	ug/L	1.53		(0%-10%)			
Beryllium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Boron		B	10.7 DU	ND	ug/L	N/A		(0%-10%)			
Cadmium		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Chromium		B	6.81 DU	ND	ug/L	N/A		(0%-10%)		08/16/14	15:31
Cobalt		B	0.101 DU	ND	ug/L	N/A		(0%-10%)		08/16/14	07:46
Copper		B	0.558 DU	ND	ug/L	N/A		(0%-10%)			
Lead		U	ND DU	ND	ug/L	N/A		(0%-10%)			
Manganese		B	1.10 DU	ND	ug/L	N/A		(0%-10%)		08/16/14	15:31
Molybdenum			6.13 D	1.20	ug/L	1.88		(0%-10%)		08/16/14	07:46
Nickel			3.42 D	0.667	ug/L	2.34		(0%-10%)		08/16/14	15:31
Selenium		U	ND DU	ND	ug/L	N/A		(0%-10%)		08/16/14	07:46
Silver		U	ND DU	ND	ug/L	N/A		(0%-10%)			

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GEL LABORATORIES LLC

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1404850										
Strontium		189	D	38.6	ug/L	1.94		(0%-10%)	PRB	08/16/14	15:31
Thallium	U	ND	D	0.788	ug/L	N/A		(0%-10%)		08/16/14	07:46
Thorium	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Tin	U	ND	DU	ND	ug/L	N/A		(0%-10%)			
Uranium		3.14	D	0.579	ug/L	7.86		(0%-10%)			
Zinc	B	4.02	DU	ND	ug/L	N/A		(0%-10%)			
Metals Analysis-ICP											
Batch	1404888										
QC1203131220	LCS										
Calcium	5000			5180	ug/L		104	(80%-120%)	HSC	08/08/14	07:41
Iron	5000			5270	ug/L		105	(80%-120%)			
Magnesium	5000			5400	ug/L		108	(80%-120%)			
Potassium	5000			5190	ug/L		104	(80%-120%)			
Sodium	5000			5040	ug/L		101	(80%-120%)			
Vanadium	500			534	ug/L		107	(80%-120%)			
QC1203131219	MB										
Calcium			U	ND	ug/L					08/08/14	07:37
Iron			U	ND	ug/L						
Magnesium			U	ND	ug/L						
Potassium			U	ND	ug/L						
Sodium			U	ND	ug/L						
Vanadium			U	ND	ug/L						
QC1203131221	352948002	MS									
Calcium	5000	48600		54000	ug/L		N/A	(75%-125%)		08/08/14	07:47

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1404888										
Iron	5000	U	ND	5190	ug/L		103	(75%-125%)			
Magnesium	5000		15400	20700	ug/L		105	(75%-125%)	HSC	08/08/14	07:47
Potassium	5000		6840	11800	ug/L		99.2	(75%-125%)			
Sodium	5000		25600	30800	ug/L		N/A	(75%-125%)			
Vanadium	500	B	16.9	543	ug/L		105	(75%-125%)			
QC1203131222 352948002 MSD											
Calcium	5000		48600	54400	ug/L	0.806	N/A	(0%-20%)		08/08/14	07:51
Iron	5000	U	ND	5230	ug/L	0.822	104	(0%-20%)			
Magnesium	5000		15400	20800	ug/L	0.761	108	(0%-20%)			
Potassium	5000		6840	11800	ug/L	0.296	99.9	(0%-20%)			
Sodium	5000		25600	31000	ug/L	0.744	N/A	(0%-20%)			
Vanadium	500	B	16.9	559	ug/L	2.93	108	(0%-20%)			
QC1203131223 352948002 SDILT											
Calcium			48600	D	9850	ug/L	1.31	(0%-10%)		08/08/14	07:54
Iron		U	ND	DU	ND	ug/L	N/A	(0%-10%)			
Magnesium			15400	D	3170	ug/L	2.75	(0%-10%)			
Potassium			6840	D	1370	ug/L	.437	(0%-10%)			
Sodium			25600	D	5200	ug/L	1.32	(0%-10%)			
Vanadium		B	16.9	D	3.00	ug/L	11.1	(0%-10%)			
Metals Analysis-Mercury											
Batch	1408293										
QC1203139995 352827001 DUP											
Mercury		U	ND	U	ND	ug/L	N/A		MTM1	08/04/14	11:01
QC1203139987 LCS											
Mercury	2.00				2.09	ug/L	104	(80%-120%)		08/04/14	10:54
QC1203139986 MB											

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QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1408293										
Mercury			U	ND	ug/L					08/04/14	10:49
QC1203139996	352827001	MS									
Mercury	2.00	U	ND	2.07	ug/L		104	(75%-125%)	MTM1	08/04/14	11:02
QC1203139997	352827001	SDILT									
Mercury		U	ND DU	ND	ug/L	N/A		(0%-10%)		08/04/14	11:04

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

General Chem Analysis

Case Narrative

**General Chemistry Narrative
Hanford MSA (HMSA)
SDG GEL352827**

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1404180

Method: 9056_ANIONS_IC: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
352827004	B2WYP9
1203129312	MB for batch 1404180
1203129315	Laboratory Control Sample (LCS)
1203129313	352827004(B2WYP9) Sample Duplicate (DUP)
1203129314	352827004(B2WYP9) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 22.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-5000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 352827004 (B2WYP9).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1203129314 (B2WYP9).

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples were diluted based on historical data: 1203129313 (B2WYP9), 1203129314 (B2WYP9) and 352827004 (B2WYP9).

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1315442. 1203129314 (B2WYP9).

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203129313 (B2WYP9), 1203129314 (B2WYP9) and 352827004 (B2WYP9).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

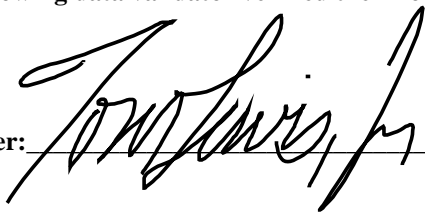
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:



Date:

13Aug14

Sample Data Summary

AUGUST 18, 2014

GEL LABORATORIES LLC

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**Certificate of Analysis Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL352827 GEL Work Order: 352827

The Qualifiers in this report are defined as follows:

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

D Results are reported from a diluted aliquot of sample.

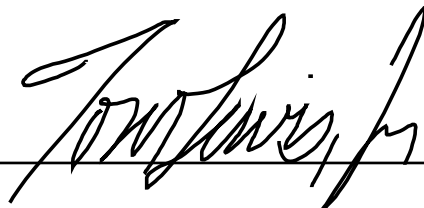
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by

A handwritten signature in black ink, appearing to read "Tom Lewis", is written over a horizontal line.

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: **CHPRC SAF I14-034**

Report Date: August 13, 2014

Client Sample ID: B2WYP9
Lab Sample ID: 352827004
Matrix: WATER
Collect Date: 16-JUL-14 08:17
Receive Date: 17-JUL-14
Collector: Client

Project: HMSA00175
Client ID: HMSA001
Client SDG: GEL352827

Parameter	Qualifier	Result	MDL	RL	CRDL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
<i>9056_ANIONS_IC: COMMON "As Received"</i>												
Fluoride	B	190	33.0	100	500	ug/L	1	RXB5	07/17/14	14:32	1404180	1
Nitrite-N	U	100	38.0	100	250	ug/L	1					
Chloride	D	12900	335	1000	200	ug/L	5	RXB5	07/17/14	16:06	1404180	2
Nitrate-N	D	4940	165	500	250	ug/L	5					
Sulfate	D	77200	665	2000	500	ug/L	5					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Quality Control Summary

AUGUST 18, 2014 GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 13, 2014

Page 1 of 2

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 352827

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1404180										
QC1203129313	352827004	DUP									
Chloride		D	12900	D	12900	ug/L	0.427	(0%-20%)	RXB5	07/17/14	16:37
Fluoride		B	190	B	184	ug/L	3.05 ^	(+/-500)		07/17/14	15:03
Nitrate-N		D	4940	D	4970	ug/L	0.615	(0%-20%)		07/17/14	16:37
Nitrite-N		U	ND	U	ND	ug/L	N/A			07/17/14	15:03
Sulfate		D	77200	D	77100	ug/L	0.186	(0%-20%)		07/17/14	16:37
QC1203129315	LCS										
Chloride	5000				4760	ug/L		95.1	(90%-110%)	07/17/14	18:12
Fluoride	2500				2500	ug/L		100	(90%-110%)		
Nitrate-N	2500				2440	ug/L		97.7	(90%-110%)		
Nitrite-N	2500				2430	ug/L		97.2	(90%-110%)		
Sulfate	10000				9740	ug/L		97.4	(90%-110%)		
QC1203129312	MB										
Chloride			U		ND	ug/L				07/17/14	17:40
Fluoride			U		ND	ug/L					
Nitrate-N			U		ND	ug/L					
Nitrite-N			U		ND	ug/L					
Sulfate			U		ND	ug/L					
QC1203129314	352827004	PS									
Chloride	5.00	D	2.58	D	7.80	mg/L		104	(90%-110%)	07/17/14	17:09
Fluoride	2.50	B	0.190		2.72	mg/L		101	(90%-110%)	07/17/14	15:35
Nitrate-N	2.50	D	0.988	D	3.52	mg/L		101	(90%-110%)	07/17/14	17:09

AUGUST 18, 2014
GEL LABORATORIES LLC

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QC Summary

Workorder: 352827

Page 2 of 2

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography												
Batch	1404180											
Nitrite-N	2.50	U	ND		2.50	mg/L		100	(90%-110%)		07/17/14	15:35
Sulfate	10.0	D	15.4	D	26.6	mg/L		111 *	(90%-110%)	RXB5	07/17/14	17:09

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

AUGUST 18, 2014

DATA EXCEPTION REPORT

Mo.Day Yr. 19-JUL-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Liquid	Client Code: HMSA
Batch ID: 1404180	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 352827(GEL352827) Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/PS: QC 1203129314PS		1. The PS failed required acceptance limits for Sulfate due to matrix interference. Of the remaining anions in the PS, several met required acceptance limits. This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported.	

Originator's Name:

Rachael Bell 19-JUL-14

Data Validator/Group Leader:

Thomas Lewis 13-AUG-14

Radiological Analysis

AUGUST 18, 2014
Radiochemistry Case Narrative
Hanford MSA (HMSA)
SDG GEL352827
Work Order 352827

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Batch Number: 1406798

Sample ID	Client ID
352827001	B2WYP3
1203135952	MB for batch 1406798
1203135955	Laboratory Control Sample (LCS)
1203135953	353473001(B2X1J6) Sample Duplicate (DUP)
1203135954	353473001(B2X1J6) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 353473001 (B2X1J6).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Sample 1203135952 (MB) was recounted due to high MDC. The recount is reported. Samples 352827001 (B2WYP3) were recounted to verify sample results. The recount results are similar to the original results. Recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Batch Number: 1407073

Sample ID	Client ID
352827002	B2WYP4
1203136684	MB for batch 1407073
1203136687	Laboratory Control Sample (LCS)
1203136685	352827002(B2WYP4) Sample Duplicate (DUP)
1203136686	352827002(B2WYP4) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 352827002 (B2WYP4).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike, 1203136686 (B2WYP4), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

AUGUST 18, 2014

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL352827 GEL Work Order: 352827

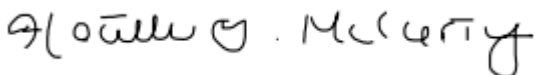
The Qualifiers in this report are defined as follows:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Heather McCarty

Date: 06 AUG 2014

Title: Analyst II

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Address : Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF I14-034

Report Date: August 6, 2014

Client Sample ID: B2WYP3
 Sample ID: 352827001
 Matrix: WATER
 Collect Date: 16-JUL-14
 Receive Date: 17-JUL-14
 Collector: Client

Project: HMSA00175
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Liquid Scintillation Analysis													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium		1120	+/-104	85.3	+/-240	100	pCi/L		BYS1	08/03/14	1357	1406798	1

The following Analytical Methods were performed

Method	Description
1	EPA 906.0 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
---------------------------	------	----------	-----------	-------------------

Notes:
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Certificate of Analysis

Company : CH2MHill Plateau Remediation
Address : Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Report Date: August 6, 2014

Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF I14-034

Client Sample ID: B2WYP4
Sample ID: 352827002
Matrix: WATER
Collect Date: 16-JUL-14
Receive Date: 17-JUL-14
Collector: Client

Project: HMSA00175
Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	-----	-----	----	-------	----	---------	------	------	-------	------

Rad Liquid Scintillation Analysis

C14_LSC: COMMON "As Received"

Carbon-14		514	+/-11.5	5.95	+/-96.0	5.00	pCi/L		GXR1	08/05/14	0932	1407073	1
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The following Analytical Methods were performed

Method	Description
1	EPA EERF C-01 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Notes:
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Quality Control Data

QC Summary

Report Date: August 6, 2014
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 352827

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1406798									
QC1203135952	MB									
Tritium			U	-26	pCi/L			BYS1	08/03/14	22:40
			Uncert:	+/-41.9						
			TPU:	+/-41.9						
QC1203135953	353473001	DUP								
Tritium		14200		14100	pCi/L				08/01/14	08:54
		Uncert:	+/-330	+/-333		RPD: 1	(0% - 20%)			
		TPU:	+/-2760	+/-2740		RER: 0.0624	(0-2)			
QC1203135954	353473001	MS								
Tritium		1770	14200	16100	pCi/L	REC: 109	(75%-125%)		08/01/14	10:26
		Uncert:	+/-330	+/-855						
		TPU:	+/-2760	+/-3230						
QC1203135955	LCS									
Tritium		1770		1560	pCi/L	REC: 88	(80%-120%)		08/01/14	10:44
		Uncert:		+/-285						
		TPU:		+/-415						
Batch	1407073									
QC1203136684	MB									
Carbon-14			U	-2.48	pCi/L			GXR1	08/05/14	10:29
			Uncert:	+/-2.31						
			TPU:	+/-2.31						
QC1203136685	352827002	DUP								
Carbon-14		514		522	pCi/L				08/05/14	13:30
		Uncert:	+/-11.5	+/-11.5		RPD: 2	(0% - 20%)			
		TPU:	+/-96.0	+/-97.5		RER: 0.116	(0-2)			
QC1203136686	352827002	MS								
Carbon-14		1520	514	2100	pCi/L	REC: 104	(75%-125%)		08/05/14	14:28
		Uncert:	+/-11.5	+/-88.4						
		TPU:	+/-96.0	+/-399						
QC1203136687	LCS									
Carbon-14		379		377	pCi/L	REC: 99	(80%-120%)		08/05/14	14:44
		Uncert:		+/-19.0						
		TPU:		+/-72.5						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

QC Summary

Workorder: 352827

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
B	The analyte was detected in both the associated QC blank and in the sample.									
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample									
C	Analyte has been confirmed by GC/MS analysis									
C	Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.									
D	Results are reported from a diluted aliquot of sample.									
E	Concentration exceeds the calibration range of the instrument									
E	Reported value is estimated due to interferences. See comment in narrative.									
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated									
M	Duplicate precision not met.									
N	Spike Sample recovery is outside control limits.									
P	Aroclor target analyte with greater than 25% difference between column analyses.									
S	Reported value determined by the Method of Standard Additions (MSA)									
T	Spike and/or spike duplicate sample recovery is outside control limits.									
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.									
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency $< 50\%$ of spike absorbency.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
o	Analyte failed to recover within LCS limits (Organics only)									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of \pm the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.